

TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35.U.S.C. 371

EXPRESS MAIL LABEL No
EF321690397US

DATE
08 MARCH 2001

ATTORNEY'S DOCKET NO
A34093 PCT USA

U S APPLICATION NO

09/786739

INTERNATIONAL APPLICATION NO
PCT/NZ99/00149

INTERNATIONAL FILING DATE
07 SEPTEMBER 1999

PRIORITY DATE CLAIMED
08 SEPTEMBER 1998

TITLE OF INVENTION

BUILDING FRAME AND METHOD OF CONSTRUCTION

APPLICANT(S) FOR DO/EO/US

Philip George Ellis

Applicant herewith submits to the United States Designated /Elected Office (DO/EO/US) the following items and other information:

1. ☒ This is a FIRST submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a SECOND or SUBSEQUENT submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (35 U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(I).
4. ☐ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. ☐ A copy of the International Application as filed (35 U.S.C. 371(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ has been transmitted by the International Bureau.
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☐ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☐ have been transmitted by the International Bureau
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☐ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☐ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☐ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☐ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A FIRST preliminary amendment.
14. ☐ A SECOND or SUBSEQUENT preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☒ Other items or information:

International Publication WO 00/14355 (w/ 6 sheets drawings, 4 pages claims, 9 pages spec)

International Search Report

International Preliminary Exam Report

PCT Request

PCT Demand

PCT/IB/306-2sheets

INTERNATIONAL APPLICATION NO.
PCT/NZ 99/0749 **09/786739**

INTERNATIONAL FILING DATE
07 SEPTEMBER 1999

PRIORITY DATE CLAIMED
08 SEPTEMBER 1998

17. ☒ The following fees are submitted:

CALCULATIONS PTO USE ONLY

Basic National Fee (37 CFR 1.492(a)(1)-(5):

Neither international preliminary examination fee (37 CFR 1.482)
Nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO and International Search Report not prepared by the EPO or JPO (1.492(a)(3)) \$1,000.00
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but International Search Report prepared by the EPO or JPO (1.492(a)(5)) \$860.00
International preliminary examination fee (37 CFR 1.482) not paid to USPTO but international search fee (37 CFR 1.445(a)(2)) paid to USPTO(1.492(a)(2)) \$710.00
International preliminary examination fee paid to USPTO (37 CFR 1.482) but all claims did not satisfy provisions of PCT Article 33(1)-(4) (1.492(a)(1)) \$690.00
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(1)-(4) \$ 100.00

ENTER APPROPRIATE BASIC FEE AMOUNT = \$1,000.00

Surcharge of \$130.00 for furnishing the oath or declaration later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 C.F.R. 1.492(e)).

\$

Claims	Number Filed	Number Extra	Rate	\$	
Total Claims	15	-20=	X \$ 18.00	\$	
Independent Claims	5	-3= 2	X \$ 80.00	\$ 160.00	
Multiple dependent claim(s) (if applicable)			+ \$270.00	\$	

TOTAL OF ABOVE CALCULATIONS = \$1,160.00

Reduction by 1/2 for filing by small entity, if applicable. **Small Entity Status is claimed** (Note 37 CFR 1.9, 1.27, 1.28).

\$ 580.00

SUBTOTAL = \$ 580.00

Processing fee of \$130.00 for furnishing the English translation later than ☐ 20 ☐ 30 months from the earliest claimed priority date (37 CFR 1.492(f)).

+ \$

TOTAL NATIONAL FEE = \$ 580.00

Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). \$40.00 per property

+ \$

TOTAL FEES ENCLOSED = \$ 580.00

Amt. refunded \$

charged \$

a. ☒ A check in the amount of \$ 580.00 to cover the above fees is enclosed.

b. ☐ Please charge our Deposit Account No. 02-4377 in amount of \$ to cover the above fees. A copy of this sheet is enclosed.

c. ☒ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. 02-4377. A copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

BAKER BOTTS L.L.P.
30 Rockefeller Plaza
New York, New York 10112-4498

Signature **RONALD B. HILDRETH**

March 8, 2001

Date

19,498

Registration No.

A34093 PCT USA

PATENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant : Philip George Ellis
Serial No. : To be Assigned
Filed : To be Assigned
For : BUILDING FRAME AND METHOD CONSTRUCTION

PRELIMINARY AMENDMENT

Assistant Commissioner of Patents

Washington, D.C. 20231

Sir:

Preliminary to the examination of the above-identified application, please make the following amendment to the claims:

In the Claims:


Amend the following claims:

4. (Amended) Roll forming apparatus according to claim 1 including a moveable operation unit including one or more functional components each adapted to produce a specified feature on the metal frame member during roll forming.
6. (Amended) Roll forming apparatus according to claim 5 wherein the or each functional component includes at least one hole punch, a guillotine and a notching unit for removing a section of a base of the channel.
7. (Amended) Roll forming apparatus according to claim 1 including computing means adapted to control and synchronise roll forming, lip-forming, groove-forming, and the operational unit including all functional components.

Cancel claims 16 to 20.

This amendment eliminates multiple dependency in the claims and puts the claims in better U.S. format. No new matter is introduced by this amendment.

Respectfully submitted,


Ronald B. Hildreth
Patent Office Reg. No. 19,498

Ronald B. Hildreth
Patent Office Reg. No. 19,498

Attorneys for Applicant
(212) 705-2544

Baker Botts L.L.P.
30 Rockefeller Plaza
New York NY 10112

VERSION WITH MARKINGS TO SHOW CHANGES MADE

4. (Amended) Roll forming apparatus according to claim 1 ~~any one of claims 1 to 3~~ further including a moveable operation unit including one or more functional components each adapted to produce a specified feature on the metal frame member during roll forming.

6. (Amended) Roll forming apparatus according to ~~either claim 4 or~~ claim 5 wherein the or each functional component includes at least one hole punch, a guillotine and a notching unit for removing a section of a base of the channel.

7. (Amended) Roll forming apparatus according to claim 1 ~~any one of the preceding claims further~~ including computing means adapted to control and synchronise roll forming, lip-forming, groove-forming, and the operational unit including all functional components.

Cancel claims 16 to 20.

6/PRTS

09/786739
JC02 Rec'd PCT/PTO 08 MAR 2001

WO 00/14355

PCT/NZ99/00149

BUILDING FRAME AND METHOD OF CONSTRUCTION

FIELD OF INVENTION

5

This invention relates to metal framing, in particular steel framing, for building construction. The invention also relates to a method of constructing a metal frame assembly and apparatus for producing metal framing for building construction.

10

BACKGROUND OF INVENTION

The high costs of timber have made the use of steel framing in building construction cost effective. Known forms of steel frame construction require the riveting together of frame members which make up the studs and nogs of the frame. Since the frame members generally have a C-section it is necessary to bend back the lip at various points along a stud where a nog is to be interconnected. This bending out or flattening of the lip can introduce bending or deformation of the frame member. Furthermore, because all components of a frame are made from members of the same cross-section, the required overlapping of members when a nog is inserted between the sides of a stud results in localised deformation of the stud. Any deformations in the sides of the frame members results in an uneven planar surface of the frame with consequential difficulties in affixing a cladding to the frame with a preferred even finish.

25

A further limitation associated with conventional methods of constructing steel framing for building relates to the fact that the framing is manufactured off site in standard lengths. The construction of a frame from such preformed lengths at a construction site is labour intensive and therefore costly. Each standard piece has to be manually cut, punched and assembled on site.

30

It is an object of the present invention to provide a method of manufacture of a metal frame section for building construction and/or a method of constructing a metal frame assembly for building construction and/or apparatus for forming metal frame sections, which reduces or overcomes the abovementioned problems, or
5 which at least provides the public with a useful alternative.

Other objects of the invention may become apparent from the following description which is given by way of example only.

10 SUMMARY OF INVENTION

According to one aspect of the present invention there is provided roll forming apparatus adapted to form, from sheet metal strip, metal frame members for use in building construction, said apparatus including lip forming members
15 engageable to convert a roll-formed U-section channel profile to a C-section channel profile, and said apparatus adapted to form the said U-section and C-section channel profiles simultaneously on the same sheet metal strip.

Preferably, the roll forming apparatus may further be adapted to roll form
20 different widths of channel profile at selected regions during a continuous roll forming operation.

Preferably the apparatus may further include a moveable operational unit including one or more functional components.
25

Preferably the apparatus may further include computing means adapted to control and synchronise roll forming, lip-forming, groove-forming and the operational unit.

30 According to a further aspect of the present invention there is provided a method of constructing a building frame assembly said method including the steps of:

- recording data defining a unit area in which the frame assembly is to fit,

- processing the data on computing means to design the frame assembly to fit the unit area,
 - controlling operation of roll forming apparatus adapted to form channel-shaped metal frame members from sheet metal strip, using the
- 5 processed data from the computing means, to produce frame members cut and formed ready for assembly to produce the required design of frame assembly.

10 According to a further aspect of the present invention there is provided a frame assembly for use in building construction, the assembly including a plurality of metal frame members, portions of selected frame members having a U-section channel profile swaged or narrowed portion adapted to engage within the sides of a U-section channel profile of another frame member substantially without deforming the profile of the other frame member.

15 Preferably, the frame assembly may include a plurality of first metal frame members forming studs and a plurality of second metal frame members forming nogs.

20 According to a further aspect of the invention there is provided a method of constructing a metal frame member from a sheet metal strip on roll forming apparatus, the method including forming U-section and C-section channel profiles simultaneously on the same sheet metal strip.

25 Other aspects of the present invention may become apparent from the following description which is given by way of example only and with reference to the accompanying drawings.

BRIEF DESCRIPTION OF DRAWINGS

30

Figure 1:

Shows a perspective view of a junction between nogs and a stud of a metal frame assembly of the present invention, in one form;

Figure 2:

Shows a junction between an end of a stud and a base plate, or an end of a nog and a stud, of a metal frame assembly of the present invention;

5 **Figure 3:**

Shows a nog of an assembly of the invention in one preferred form;

Figure 4:

10 Shows a perspective view of a junction between nogs and a stud of a metal frame assembly of the invention in an alternative preferred form;

Figure 5:

Shows a schematic representation of roll forming apparatus of the present invention in one preferred form.

15

Figure 6:

Is a flow diagram of the steps involved in a method of the invention for producing a metal frame assembly.

20 **DETAILED DESCRIPTION OF INVENTION**

This invention has several aspects all directed towards the efficient construction of metal frame assemblies. Hereafter, such assemblies and their components are referred to as steel frame members or assemblies since steel is the current metal of choice. However, it will be appreciated that other metals or alloys may be used.

25 The first aspect of the invention relates to a method of construction of steel frame members in a form which facilitates assembly of the frame and which enables a frame to be produced with substantially planar surfaces. This is achieved by using roll forming apparatus to produce the steel frame channel members with a U-cross-section and forming this into a C-cross-section only at portions between or free from intended junctions. It is further facilitated by including one or more longitudinal

PCT/NZ99/00149

ridges or slots in the base of the channel and increasing the depth of the or each ridge at regions which will need to be engaged within an interconnecting section. Increasing the depth of the ridge narrows or swages that region so that, for example, a swaged frame member end may engage within the C-section of another unit
 5 without splaying the sides of that other unit (see Figure 2); or a swaged portion of a frame member may be adapted to engage with an end of another unit whilst retaining a substantially even planner outer surface (see Figure 4).

Figure 1 shows an interconnection between nogs 2, 3 and a stud 4 in an
 10 assembly of the present invention in one form.

At the region of interconnection 9 the stud 4 and ends 5, 6 of the nogs 2, 3 have a U-shaped cross-section. At intermediate points they have a C-shaped cross-section, with rolled-over lip edges 7. In the base 8 of each frame member there are
 15 longitudinal ridges 10.

The end 6 of nog 3 is swaged or narrowed slightly to engage neatly within the U-shaped part 9 of the stud 4. This is more readily apparent from Figures 2 and 3.
 20

Slots 11 may be formed in the edges 12 of the base of the stud 4 at the region of intended interconnection with a nog. With reference to Figure 3, nog 2 has an end portion 13 of the base cut away, leaving side portions 14 extending beyond the end of the U-section. These side portions 14 are narrowed or swaged in relation
 25 to the remainder of the section in order to engage neatly through the slots 11 in the stud.

In an alternative configuration, with reference to Figure 4, and to avoid the need for forming lateral slots in the stud, the stud may be swaged or narrowed at the
 30 regions of intended connection with nogs. The end of a nog 2 having the cut-away base and extending side portions 14 would not then be swaged, but the side portions 14 would rather engage about the outside of the swaged portion 25 of the stud 4. The nog 3 on the other side of the stud 4, if any, would still have a swaged portion

adapted to engage within the stud channel. Figure 4 shows an assembly in this configuration.

Holes may have been prepunched through the sides of the stud and nogs to
5 receive rivets 15 which securely engage the components of the assembly together.
Recesses or dimples 16 may also be preformed in the outer surface of the stud, about
the punched hole so that a rivet head is recessed or substantially flush with the stud
side surface.

10 With this design of assembly there is no deformation of the sides of the stud
at the regions of interconnection with nogs, ensuring that cladding applied to the
surface of a constructed frame will have an even finish.

Figure 2 shows the connection between the bottom of a stud 20 and a base
15 plate 21, although this could equally represent interconnection of the nog 3 of Figure
1 into its stud 2. It can be seen that the base plate 21 differs from the stud 20
primarily in having a C-section along its entire length, there being no requirement
for the strengthening achieved by rolling to form a C-section. The U-section end 22
of the stud 20 is narrowed or swaged to engage within the base plate 21 without
20 deforming the sides of the base plate.

The narrowing or swaging of ends of frame members is achieved in the
process of manufacturing each section by increasing the depth of the ridges 10.

25 A second main aspect of the invention relates to the method by which the
individual components of a required frame assembly are manufactured. This is
achieved by use of roll forming apparatus adapted to produce frame members of the
desired configuration from galvanised flat steel in coil form. The roll forming
apparatus may be portable so as to be located at a construction site. Alternatively,
30 the roll forming apparatus may be located at a central manufacturing site, with
information for specific jobs downloaded directly to the apparatus.

With reference to Figure 5, the roll former 41 includes a first set of rollers 42 adapted to convert the flat steel 43 from the coil 44 into a U-shaped channel. Lip rollers 45 are provided to convert parts of the U-shaped channel into a C-section. Swage rollers 46 introduce the ridges in the base of the channel, and are adapted to control the depth of the ridges.

The apparatus may include two sets of lip rollers, the first to form a lip at substantially 45° and the second to continue the lip to substantially 90°, in relation to the channel sides.

10

A moving tool bed or operational unit 47 is provided. This servo-controlled tool bed may include a slitter 48 for producing slits in the sides of the base of the channel at the regions of intended interconnection, a service hole punch 49 adapted for producing holes for electrical wires, plumbing pipes and the like, a notcher 50 for removing a section of the base of the channel which then leaves protruding side portions of a nog for engagement in a stud, and a guillotine and hole punch unit 51 for punching and optionally counter-sinking rivet holes and guillotining each frame member to length. The servo-controlled system enables these functions to be carried out during continuous feed of the steel through the apparatus. It will be appreciated that more or less features may be included on the servo table; for example the slitter may be omitted.

20

At least one set of the first rollers 42 may be knurling rollers 53 adapted to form textured outer sides of the U-channel. The knurling of the sides of the channel assists in preventing screws from slipping when applying a cladding such as gypsum plasterboard to a completed assembly.

25

The roll forming apparatus 41 is adapted to produce U-shaped and C-shaped section simultaneously by control of the lip rolling function. This enables framing sections to be produced which do not require flattening of lip portions to enable interconnection of the end of one member within the channel of another. Similarly, the swaging or narrowing of profile at desired regions can be achieved within the single roll former in a continuous operation.

30

The roll forming apparatus is controlled by computing means.

The roll forming apparatus may be driven by hydraulic motor or
5 alternatively by an electric motor. It is preferably adapted to roll from 0.4 to 1.2
millimetre gauge steel or galvanised steel.

Optionally, the roll former may also include a straightening station,
comprising vertically disposed pairs of rollers about each side wall for lateral
10 straightness and a pair of horizontally disposed rollers for vertical straightness, to
ensure that each frame member is straight. Flat steel in coil form is not always
straight, and this can result in bends or warps in individual lengths of building
elements.

15 A preferred method of producing a building frame assembly of the invention
is now described with reference to Figure 6.

The measurements of a space for which a frame assembly is required is
taken on site manually, or automatically by a laser measuring device. This data is
20 entered into a computing means such as a palm-top or notebook computer. Also
loaded into the computer are details from the architectural plans. Where
architectural plans are available in electronic form, the on site data is used for
verification.

25 The data is processed using specific software to generate a required frame
design for that space. This design will include not only the dimensions of the space
but also the locations and dimensions of architectural and other features required to
be accommodated in the space, such as windows, doors, air-conditioning ducts,
electrical sockets and switches and the like. The frame assembly outline is then
30 downloaded via cellphone or an internet link, for example, to the factory site where
the rollformer is located. The rollformer computer controls all operations of the
rollformer to produce the frame members required for the frame assembly. Thus, the
length and configuration or form of each frame member for this frame assembly are

calculated by the computer; which in turn controls operation of the roll former to form each required frame member from the flat steel coil in a substantially continuous operation.

- 5 Thus, by employing the method of the present invention involving the roll forming apparatus described, customised frame assemblies to fit spaces having specified design characteristics can be manufactured and constructed conveniently and efficiently. Effectively a kit set of frame members is provided for each required building frame assembly. This avoids the problems associated with the use of
- 10 standard preformed steel frame members which must be manually cut, punched and forced together in a manner which often results in the deformation of the smooth surfaces to which cladding must be applied.

- Where in the foregoing description reference has been made to specific
- 15 components or integers of the invention having known equivalents then such equivalents are herein incorporated as if individually set forth.

- Although this invention has been described by way of example and with reference to possible embodiments thereof it is to be understood that modifications
- 20 or improvements may be made thereto without departing from the scope or spirit of the invention.

CLAIMS

1. Roll forming apparatus adapted to form, from sheet metal strip, metal frame members for use in building construction, said apparatus including lip forming members engageable to convert a roll-formed U-section channel profile to a C-section channel profile, and said apparatus adapted to form the said U-section and C-section channel profiles simultaneously on the same sheet metal strip.
2. Roll forming apparatus according to claim 1 further including channel-width adjustment means adapted to adjust the width of a channel profile at selected regions during roll forming.
3. Roll forming apparatus according to claim 2 wherein the channel width adjustment means includes one or more rollers adapted to form a groove or grooves in the channel base, and at least one of said rollers adjustable to increase the groove depth.
4. Roll forming apparatus according to any one of claims 1 to 3 further including a moveable operational unit including one or more functional components each adapted to produce a specified feature on the metal frame member during roll forming.
5. Roll forming apparatus according to claim 4, wherein the operational unit is servo-controlled.
6. Roll forming apparatus according to either claim 4 or claim 5 wherein the or each functional component includes at least one hole punch, a guillotine and a notching unit for removing a section of a base of the channel.

7. Roll forming apparatus according to any one of the preceding claims further including computing means adapted to control and synchronise roll forming, lip-forming, groove-forming, and the operational unit including all functional components.
- 5
8. A metal frame member for use in building construction said frame member having predominately a C-section channel profile with at least one portion having a U-section channel profile, and wherein one or more of said U-section channel profiles is swaged or narrowed in relation to the C-section channel profile.
- 10
9. A frame assembly for use in building construction, the assembly including a plurality of metal frame members, portions of selected frame members having a U-section channel profile swaged or narrowed portion adapted to engage within the sides of a U-section channel profile of another frame member substantially without deforming the profile of that other frame member.
- 15
10. A frame assembly according to claim 9 including a plurality of first metal frame members forming studs and a plurality of second metal frame members forming nogs.
- 20
11. A frame assembly according to claim 10 including at least one assembly junction including:
- 25
- a stud having a U-section channel profile swaged or narrowed portion,
 - a first nog having a U-section channel profile end portion with a base of the channel cut away in this U-section channel portion such that channel sides at this portion are engageable over the U-section channel profile swaged or narrowed portion of the stud, and
- 30

- a second nog having a U-section channel profile swaged or narrowed end portion engageable within the U-section channel profile swaged or narrowed portion of the stud.

- 5 12. A method of constructing a metal frame member from a sheet metal strip on roll forming apparatus, the method including forming U-section and C-section channel profiles simultaneously on the same sheet metal strip.
- 10 13. A method of constructing a building frame assembly, said method including the steps of:
- recording data defining a unit area in which the frame assembly is to fit,
 - 15 - processing the data on computing means to design the frame assembly to fit the unit area,
 - controlling the operation of roll forming apparatus adapted to form channel-shaped metal frame members from sheet metal strip, using the processed data from the computing means, to produce frame members formed and cut ready for assembly to produce the required design of building frame assembly.
- 20
- 25 14. A method of constructing a building frame assembly according to claim 13 wherein the data defining the unit area includes data from the architectural/design drawings such that the frame assembly designed is adapted to accommodate all utility and architectural features required in the unit area.
- 30 15. A method of constructing a building frame assembly according to claim 14 wherein the data further includes physical measurements of actual dimensions of the unit area.

16. Roll forming apparatus substantially as herein described and with reference to Figure 4.
17. A metal frame member substantially as herein described and with reference to the accompanying drawings.
18. A building frame assembly substantially as herein described and with reference to the accompanying drawings.
19. A method of forming a metal frame member substantially as herein described and with reference to the accompanying drawings.
20. A method of constructing a building frame assembly substantially as herein described and with reference to the accompanying drawings.

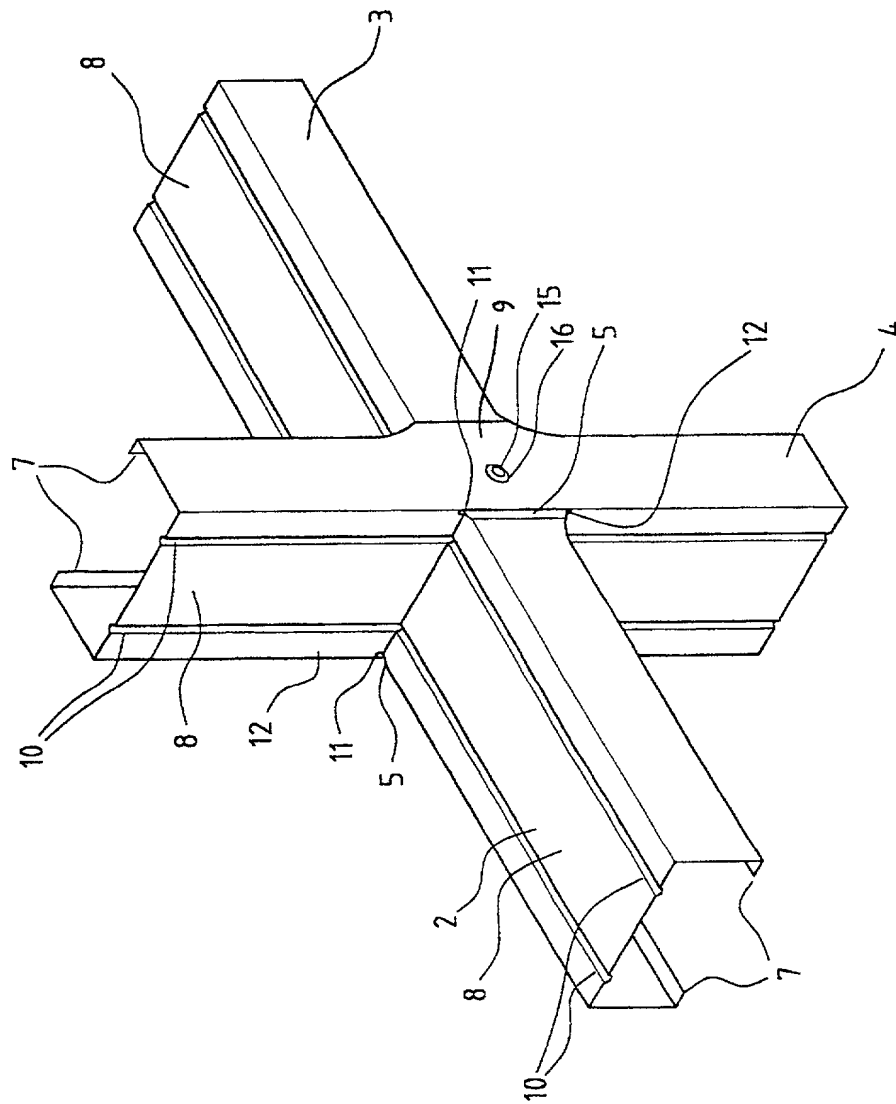


FIG.1.

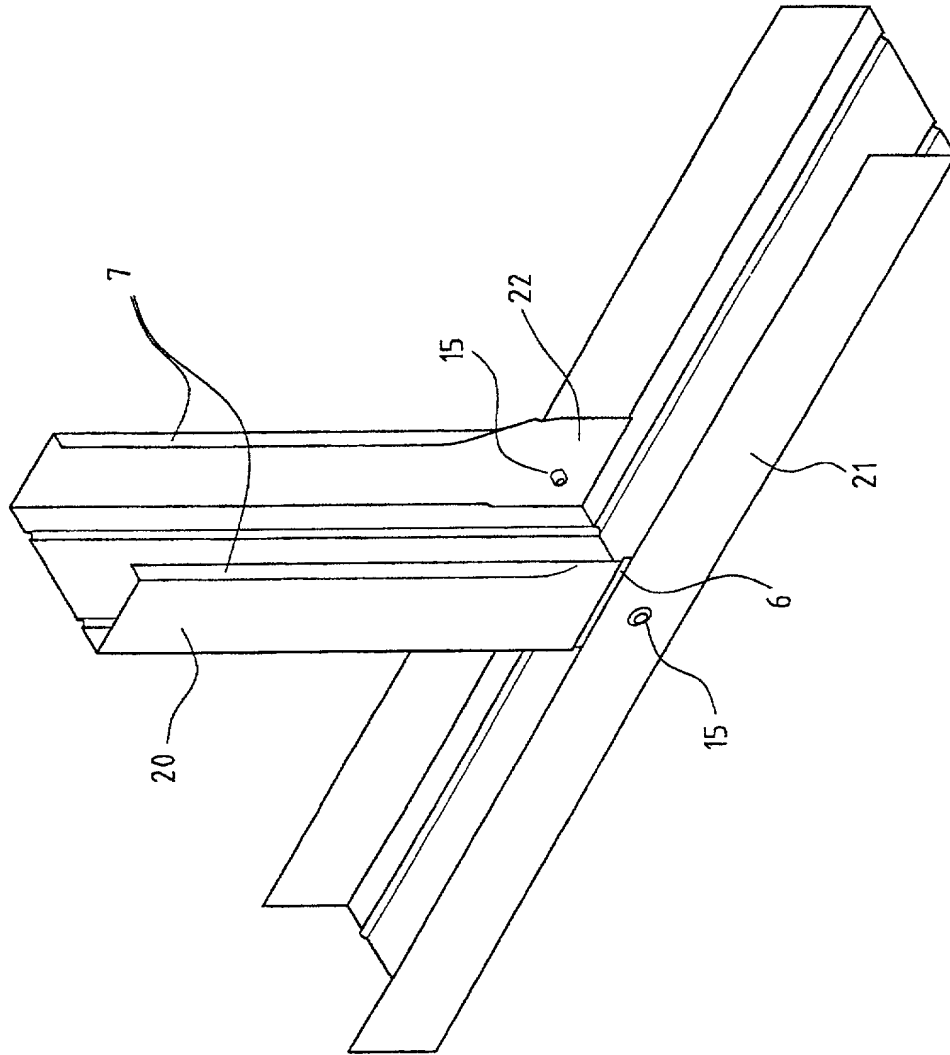


FIG. 2.

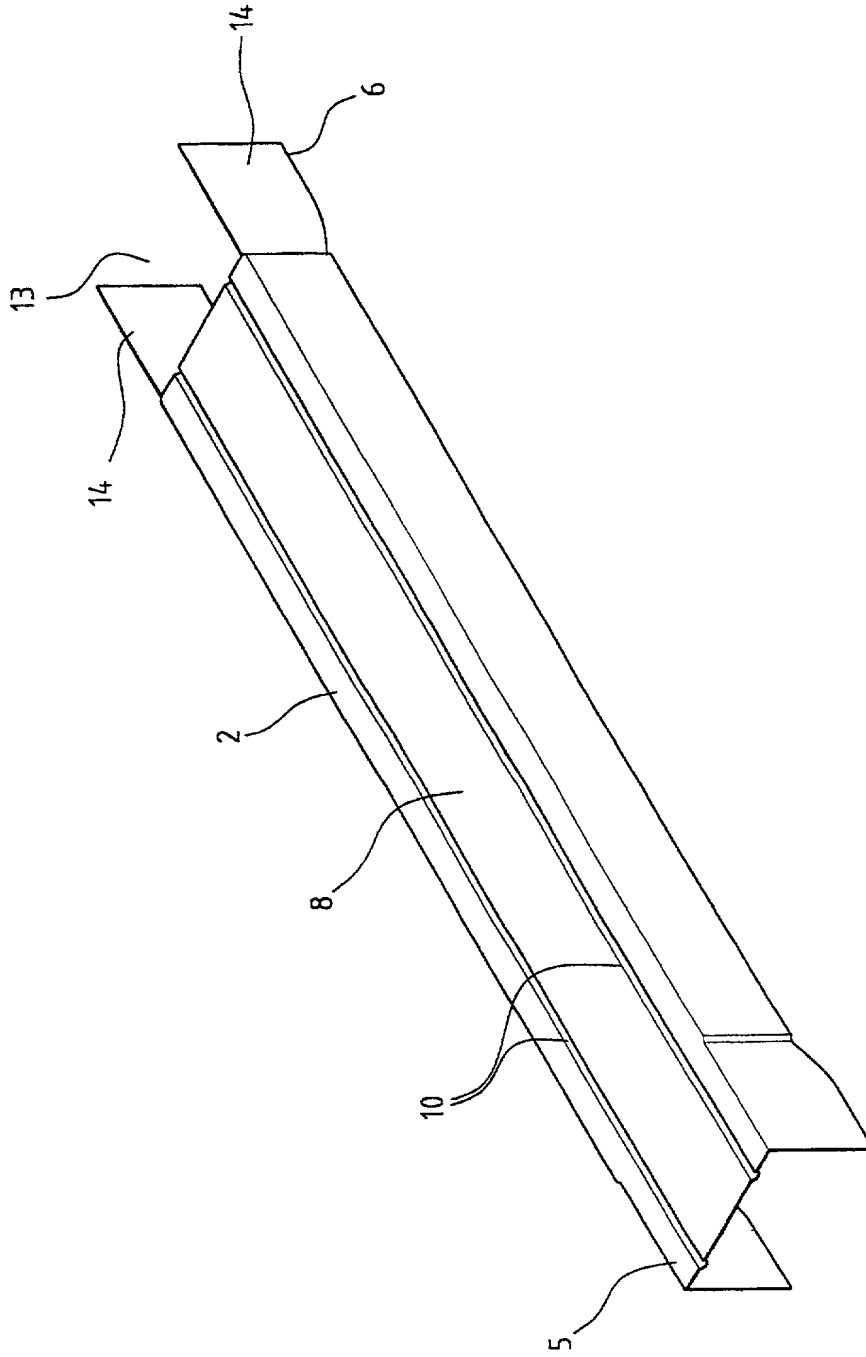


FIG. 3.

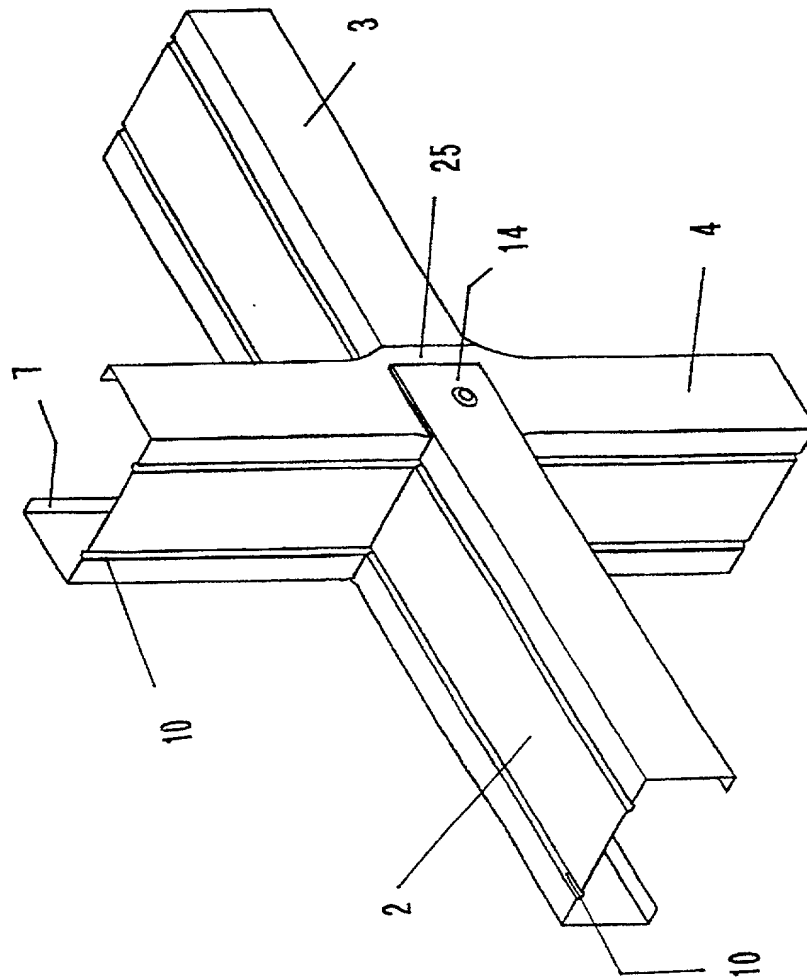


FIG. 4

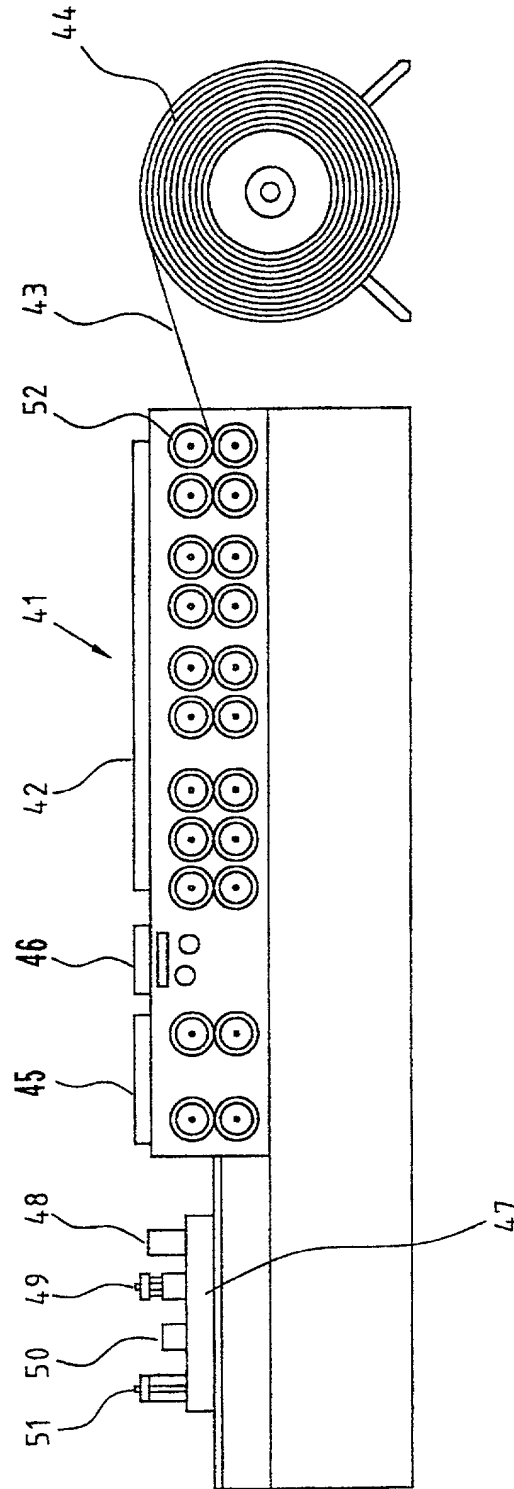


FIG. 5

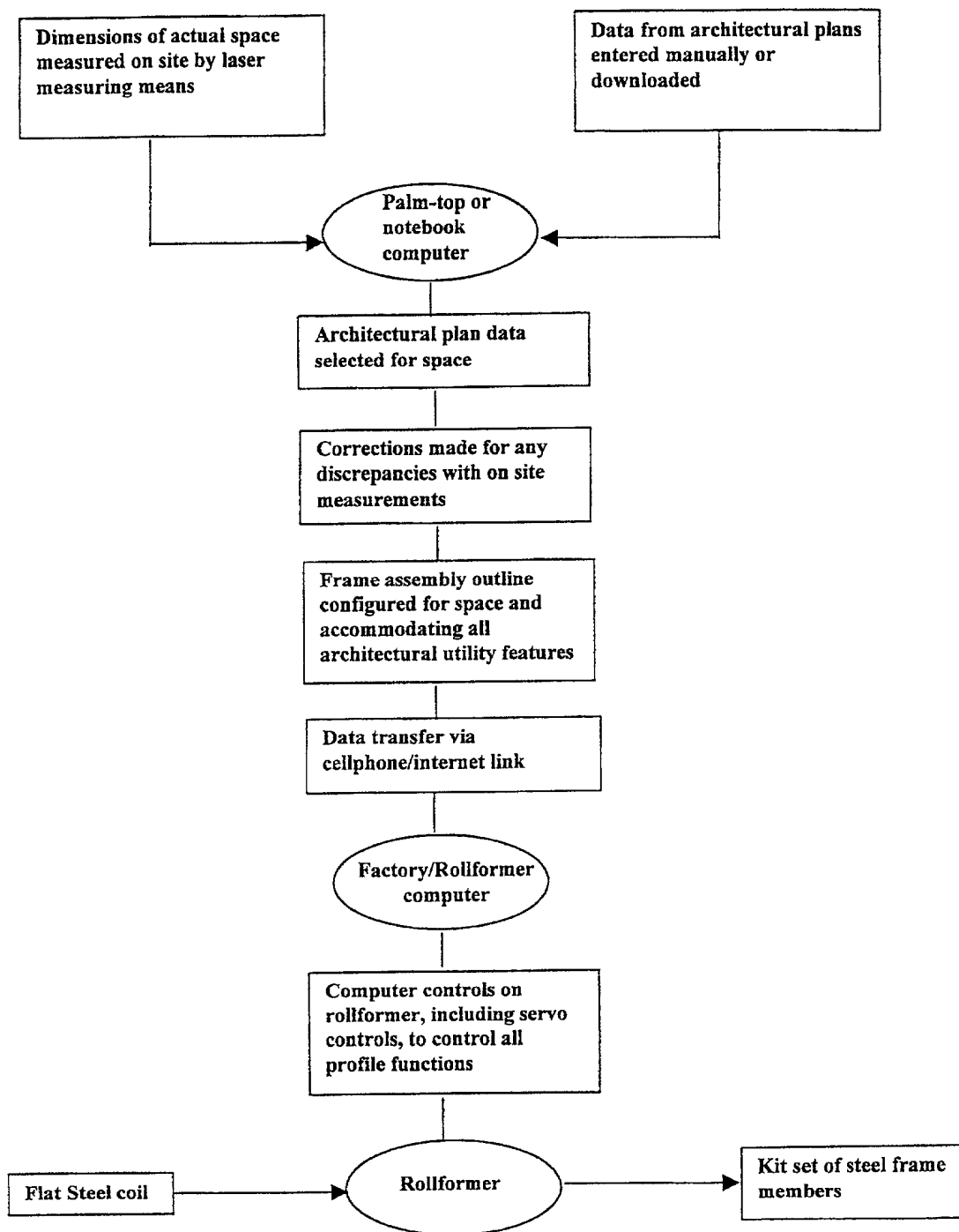


FIG. 6

A 34093 PCT USA

**COMBINED DECLARATION
AND POWER OF ATTORNEY****(Original, Design, National Stage of PCT, Divisional, Continuation or C-I-P Application)**

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name; I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

BUILDING FRAME AND METHOD OF CONSTRUCTION

This declaration is of the following type:

- ☐ original
- ☐ design
- ☒ national stage of PCT.
- ☐ divisional
- ☐ continuation
- ☐ continuation-in-part (C-I-P)

the specification of which: *(complete (a), (b), or (c))*

- (a) ☐ is attached hereto.
- (b) ☒ was filed on March 8, 2001 as Application Serial No. 09/786,739 and was amended on *(if applicable)*.
- (c) ☐ was described and claimed in PCT International Application No. filed on and was amended on *(if applicable)*.

Acknowledgement of Review of Papers and Duty of Candor

I hereby state that I have reviewed and understood the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the patentability of the subject matter claimed in this application in accordance with Title 37, Code of Federal Regulations § 1.56.

☐ In compliance with this duty there is attached an information disclosure statement, 37 CFR 1.98.

Priority Claims

I hereby claim foreign priority benefits under Title 35, United States Code, § 119(a)-(d) of any foreign application(s) for patent or inventor's certificate or of any PCT International Application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT International Application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application on which priority is claimed

(complete (d) or (e))

- (d) ☐ no such applications have been filed.
- (e) ☒ such applications have been filed as follows:

PRIOR FOREIGN/PCT APPLICATION(S) FILED WITHIN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION			
COUNTRY	APPLICATION NO.	DATE OF FILING (day, month, year)	DATE OF ISSUE (day, month, year)
			PRIORITY CLAIMED UNDER 35 USC 119 <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/>
			<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/>
			<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/>
ALL FOREIGN APPLICATION(S), IF ANY, FILED MORE THAN 12 MONTHS (6 MONTHS FOR DESIGN) PRIOR TO SAID APPLICATION			
INTERNATIONAL	PCT/NZ99/00149	7 SEPT. 1999	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/>
NEW ZEALAND	331788	8 SEPT. 1998	<input checked="" type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/>
			<input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/>

Claim for Benefit of Prior U.S. Provisional Application(s)

I hereby claim the benefit under Title 35, United States Code, § 119(e) of any United States provisional application(s) listed below:

Provisional Application Number	Filing Date

Claim for Benefit of Earlier U.S./PCT Application(s) under 35 U.S.C. 120

(complete this part only if this is a divisional, continuation or C-I-P application)

I hereby claim the benefit under Title 35, United States Code, § 120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior application(s) in the manner provided by the first paragraph of Title 35, United States Code § 112, I acknowledge the duty to disclose information as defined in Title 37, Code of Federal Regulations, § 1.56 which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

(Application Serial No.)	(Filing Date)	(Status) (patented, pending, abandoned)

Power of Attorney

As a named inventor, I hereby appoint Dana M. Raymond, Reg. No. 18,540; Frederick C. Carver, Reg. No. 17,021; Francis J. Hone, Reg. No. 18,662; Joseph D. Garon, Reg. No. 20,420; Arthur S. Tensas, Reg. No. 18,839; Ronald B. Hildreth, Reg. No. 19,498; Thomas R. Nesbit, Jr., Reg. No. 22,075; Robert Neuner, Reg. No. 24,316; Richard G. Berkley, Reg. No. 23,463; Richard S. Clark, Reg. No. 26,154; Bradley B. Geist, Reg. No. 27,551; James J. Maune, Reg. No. 26,946; John D. Murnano, Reg. No. 29,836; Henry Tang, Reg. No. 29,705; Robert C. Scheinfeld, Reg. No. 31,300; John A. Fogarty, Jr., Reg. No. 21,348; Louis S. Sarell, Reg. No. 32,439; Rochelle K. Seide, Reg. No. 31,300; Gary M. Butler, Reg. No. 33,841; Marra E. Delaignore, Reg. No. 32,689; and Lisa B. Kole, Reg. No. 35,225 of the firm of BAKER BOTTS L.L.P., with offices at 30 Rockefeller Plaza, New York, New York 10112, as attorneys to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.

SEND CORRESPONDENCE TO:

BAKER BOTTS L.L.P.

30 ROCKEFELLER PLAZA, NEW YORK, N.Y. 10112

CUSTOMER NUMBER: 21003

DIRECT TELEPHONE CALLS TO:

BAKER BOTTS L.L.P.

(212) 705-5000

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section

1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

FULL NAME OF SOLR OR FIRST INVENTOR	LAST NAME ELLIS	FIRST NAME PHILIP	MIDDLE NAME GEORGE
RESIDENCE & CITIZENSHIP	CITY AUCKLAND	STATE or FOREIGN COUNTRY NEW ZEALAND	COUNTRY OF CITIZENSHIP NEW ZEALAND
POST OFFICE ADDRESS	POST OFFICE ADDRESS 12 BUSHLAND PARK DRIVE, ALBANY	CITY AUCKLAND	STATE or COUNTRY NEW ZEALAND
DATE 18 AUGUST, 2001	SIGNATURE OF INVENTOR <i>PHILIP</i>		
FULL NAME OF SECOND JOINT INVENTOR, IF ANY	LAST NAME	FIRST NAME	MIDDLE NAME
RESIDENCE & CITIZENSHIP	CITY	STATE or FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE or COUNTRY ZIP CODE
DATE	SIGNATURE OF INVENTOR		
FULL NAME OF THIRD JOINT INVENTOR, IF ANY	LAST NAME	FIRST NAME	MIDDLE NAME
RESIDENCE & CITIZENSHIP	CITY	STATE or FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE or COUNTRY ZIP CODE
DATE	SIGNATURE OF INVENTOR		
FULL NAME OF FOURTH JOINT INVENTOR, IF ANY	LAST NAME	FIRST NAME	MIDDLE NAME
RESIDENCE & CITIZENSHIP	CITY	STATE or FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE or COUNTRY ZIP CODE
DATE	SIGNATURE OF INVENTOR		
FULL NAME OF FIFTH JOINT INVENTOR, IF ANY	LAST NAME	FIRST NAME	MIDDLE NAME
RESIDENCE & CITIZENSHIP	CITY	STATE or FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE or COUNTRY ZIP CODE
DATE	SIGNATURE OF INVENTOR		
FULL NAME OF SIXTH JOINT INVENTOR, IF ANY	LAST NAME	FIRST NAME	MIDDLE NAME
RESIDENCE & CITIZENSHIP	CITY	STATE or FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE or COUNTRY ZIP CODE
DATE	SIGNATURE OF INVENTOR		